PATENT COOPERATION TREATY

From the:
INTERNATIONAL SEARCHING AUTHORITY

To:

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31 MAR 2005
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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	30 MAR 2005
Applicant's or agent's file reference NGM:MJL:FP21044	FOR FURTHER ACTION See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/AU2005/000035	14 January 2005	16 January 2004

International Patent Classification (IPC) or both national classification and IPC
Int. Cl. [7] G01N 21/35, G01J 3/42, 3/45, G08G 5/04

Applicant
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION et al

1. This opinion contains indications relating to the following items:

[X]	Box No. I	Basis of the opinion
[ ]	Box No. II	Priority
[ ]	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
[ ]	Box No. IV	Lack of unity of invention
[X]	Box No. V	Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
[ ]	Box No. VI	Certain documents cited
[ ]	Box No. VII	Certain defects in the international application
[X]	Box No. VIII	Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the IPEA/AU	Authorized Officer
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	**GREG POWELL** Telephone No. (02) 6283 2308

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material

      ☐ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material

      ☐ in written format

      ☐ in computer readable form

   c. time of filing/furnishing

      ☐ contained in the international application as filed.

      ☐ filed together with the international application in computer readable form.

      ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims 1-20	YES
	Claims	NO
Inventive step (IS)	Claims	YES
	Claims 1-20	NO
Industrial applicability (IA)	Claims 1-20	YES
	Claims	NO

2. Citations and explanations:

The following documents identified in the International Search Report have been considered for the purposes of this report:

D1.) PRATA A. J. , ROSE W.I., SELF S. and O'BRIEN D.M., Global, Long-Term Sulphur Dioxide Measurements From TOVS Data: A New Tool for Studying Explosive Volcanism and Climate, *Volcanism and the Earth's Atmosphere*, Alan Robock, Clive Oppenheimer, editors; Geophysical Monograph 139, ISBN 0-87590-998-1; Copyright 2003 by the American Geophysical Union; pages 75-92, see in particular Figure 1 and its description; section 3, including subsections 3.3-3.4

D2.) US 5654700 A (PRATA et al.) 5 August 1997
The whole document and in particular the paragraph bridging columns 4 and 5, Figure 5, Claims 10 and 17

NOVELTY (N)

None of the prior art documents specifically disclose determining the amount of radiation originating from water vapour at a key SO_2 wavelength from the measured radiation at the subsidiary wavelengths. Document D1, for instance, discloses estimating the background radiance at 7.3 microns by a linear interpolation. However, the background radiance (at and around the key SO_2 wavelengths) normally incorporates radiation from many atmospheric species (and not only water vapour as such). Document D2 does not specifically describe subtracting the radiation produced by water vapour as such (but it does describe radiation originating from ice in the region from 9 to 13 microns, see Figure 2, curve 15). Consequently, Claims 1-20 of the subject application appear to be novel.

INVENTIVE STEP (IS)

The invention defined in Claims 1, 4-5, 12 and 14-15 does not appear to involve an inventive step in light of the prior art documents D1 and D2 and in light of common general knowledge in the art of spectrophotometric gas detection. It is well known in the said art that sulphur dioxide produces characteristic signatures at around 7.3 and 8.6 microns. The procedure of estimating and removing the background radiance (using linear interpolation) is described in D1 and would be obvious to a person skilled in the art of spectrophotometric gas detection. The feature of determining the amount of radiation from (only) water vapour lacks clarity, as explained in Observation 1, below. However, assuming that (in some situations) the radiation from water vapour is dominating the background radiation, all the steps of Claim 1 and all the features of Claim 12 would be completely obvious to the said person skilled in the art. Consequently, claims 1, 4-5, 12 and 14-15 appear to lack an inventive step.

The features added in the appended Claims 2-3, 6-11, 13 and 16-20 are either obvious or merely a matter of design choice. Consequently, none of the appended claims contributes to a patentable ingenuity.

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. All claims are not clear in regard to the treatment of radiation originating from other atmospheric species than water vapour. For instance, the treatment of radiation originating from ice is not clear. In other words, the exact way of distinguishing between radiation from water vapour and other atmospheric species contributing to radiation at the subsidiary wavelengths is not clear.
2. Claim 2 is not clear in regard to the wording "*from a position or position*" [emphasis added].
3. Claims 6, 7, 16 and 17 are not clear in regard to the wording "*at +/- 0.5 μm*" because it is not completely clear which wavelengths (and how many subsidiary wavelengths) are being referred to.
4. Claim 12 is not clear in regard to the scope of the wording "*at just below, or above the horizon*". In particular, the meaning of "*just below*" appears to be somewhat ambiguous.
5. Figure 4 is not clear because the difference between the detector array (3) and the camera (2) is not clear. It is also not clear why the filter wheel (2) is positioned behind the camera and not in front of it. I also note that both the filter wheel and the camera are denoted with the same numeral (2).
6. Figure 6c is not clear as it is not explained in the description. In particular, the difference(s) (if any) between Figure 6c and Figure 7 are not clear.